



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 7**

11201 Renner Boulevard
Lenexa, Kansas 66219

MAR 10 2014

Dr. Robert Moser
Secretary
Kansas Department of Health and Environment
1000 S.W. Jackson, Suite 540
Topeka, Kansas 66612-1368

Dear Dr. Moser:

RE: Approval of TMDL document for Sand Creek

This letter responds to the submission from the Kansas Department of Health and Environment, originally received by the U.S. Environmental Protection Agency, Region 7, on September 27, 2013, for a Total Maximum Daily Load document which contained TMDLs for total phosphorus. Sand Creek was identified on the 2012 Kansas Section 303(d) list as impaired. This submission fulfills the Clean Water Act statutory requirement to develop TMDLs for impairments listed on a state's § 303(d) list. The specific impairments (water body segments and pollutant) are:

<u>Water Body Name</u>	<u>WBID</u>	<u>Pollutant</u>
Sand Creek	KS-LA-12-535_4	Total Phosphorus
Mud Creek	KS-LA-12-535_16	Total Phosphorus
Beaver Creek	KS-LA-12-535_26	Total Phosphorus

The EPA has completed its review of the TMDL document with supporting documentation and information. By this letter, the EPA approves the submitted TMDLs. Enclosed with this letter is the Region 7 TMDL Decision Document which summarizes the rationale for the EPA's approval of the TMDLs. The EPA believes the separate elements of the TMDLs described in the enclosed document adequately address the pollutant of concern, taking into consideration seasonal variation and a margin of safety.

Although the EPA does not approve the monitoring or implementation plans submitted by the state, the EPA acknowledges the state's efforts. The EPA understands that the state may use the monitoring plan to gauge the effectiveness of the TMDL and determine if future revisions are necessary or appropriate to meet applicable water quality standards. The EPA recognizes that technical guidance and support are critical to determining the feasibility of and achieving the goals outlined in these TMDLs. Therefore, the implementation plan in this TMDL document provides information regarding implementation efforts to achieve the loading reductions identified.

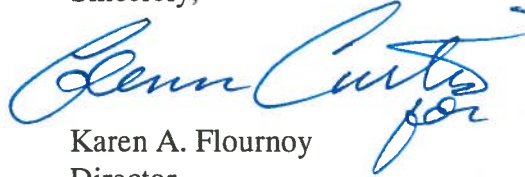


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The EPA is currently in consultation under Section 7 of the Endangered Species Act with the U.S. Fish and Wildlife Service regarding this TMDL document. While we are approving these TMDLs at the present time, we may decide that changes to the TMDL document are warranted based upon the results of the consultation when it is completed.

The EPA appreciates the thoughtful effort that the KDHE has put into these TMDLs. We will continue to cooperate with and assist, as appropriate, in future efforts by the KDHE to develop TMDLs.

Sincerely,

A handwritten signature in blue ink, appearing to read "Karen A. Flourney", with a stylized flourish at the end.

Karen A. Flourney
Director
Water, Wetlands and Pesticides Division

Enclosure

cc: Mr. John Mitchell, Director, Division of Environment, KDHE

Mr. Tom Stiles, Chief, Watershed Planning, Monitoring and Assessment Section, KDHE



EPA Region 7 TMDL Review

TMDL ID: KS-LA-12-535_4
Document Name: SAND CR

State: KS

Basin(s): LOWER ARKANSAS BASIN
HUC(s): 11030012
Water body(ies): BEAVER CR, MUD CR, SAND CR
Tributary(ies): BEAVER CREEK, MUD CREEK, SAND CREEK
Pollutant(s): BIOLOGICAL CRITERIA, BIOLOGICAL INTEGRITY, BIOTA RATED POOR, PERIPHYTON (AUFWUCHS) INDICATOR BIOASSESSMENTS, PHOSPHORUS

Submittal Date: 9/27/2013

Approved: Yes

Submittal Letter and Total Maximum Daily Load Revisions

The state submittal letter indicates final TMDL(s) for specific pollutant(s) and water(s) were adopted by the state, and submitted to the EPA for approval under Section 303(d) of the Clean Water Act [40 CFR § 130.7(c)(1)]. Include date submitted letter was received by the EPA, date of receipt of any revisions and the date of original approval if submittal is a revised TMDL document.

This TMDL document was submitted by the Kansas Department of Health and Environment as an email attachment on September 27, 2013. After receiving comments from the U. S. Environmental Protection Agency, the modified final TMDL documents were submitted as email attachments on November 25, 2013, and January 27, 2014.

Water Quality Standards Attainment

The targeted pollutant is validated and identified through assessment and data. The water body's loading capacity for the applicable pollutant is identified and the rationale for the method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources is described. The TMDL(s) and associated allocations are set at levels adequate to result in attainment of applicable water quality standards [40 CFR § 130.7(c)(1)]. A statement that the WQS will be attained is made.

There are various influences to the impairment of the Sand Creek watershed. The first is the effect of the city of Newton's wastewater on the downstream hydrology and nutrient content. The second is nonpoint sources in proximity to Sand Creek that contribute direct loadings. The final influence is wet weather sources that dominate loading during runoff events, which includes the wet weather impacts of urban storm water from Newton and runoff from nonpoint sources in the aftermath of rainfall. Storm water runoff from the city of Newton is a point source and needs to be distinguished from the rural nonpoint sources in the watershed.

Phosphorus is typically linked to sediment or total suspended solids because of the propensity of those solids to adsorb phosphorus. The lack of relation between the two indicates there is a dominant influence from Newton's wastewater due to the elevated phosphorus and low total suspended solids within Sand Creek.

The endpoint of these TMDLs will be to achieve the Kansas water quality standards by eliminating the impacts to aquatic life, domestic water supply or recreation associated with excessive phosphorus and objectionable amounts of algae as described in the Kansas narrative criteria pertaining to nutrients. There are no existing numeric phosphorus criteria currently in Kansas. The EPA's current suggested benchmarks for stream total phosphorus in the South-Central Cultivated Great Plains Ecoregion is 0.067 milligrams per liter total phosphorus over the 10 - state aggregate of Level III Ecoregions. A similar total phosphorus benchmark for the Central Great Plains was 0.090 mg/L, spanning from Nebraska to Texas. Sand Creek resides in the 27d Ecoregion, the Wellington - McPherson Lowlands. Four metrics will serve to establish if the biological community of Sand Creek reflects recovery, renewed diversity and minimal disruption by the impacts described in the narrative

criteria for nutrients on aquatic life, recreation and domestic water supply.

Four Biological Metrics:

1. Macroinvertebrate Biotic Index: A statistical measure that evaluates the effects of nutrients and oxygen demanding substances on macroinvertebrates based on the relative abundance of certain indicator taxa (orders and families): for Kansas, MBI values below 4.5 are indicative of fully supported aquatic life communities.
2. Ephemeroptera, Plecoptera and Trichoptera abundance as a percentage of the total abundance of macroinvertebrates: for Kansas, EPT percentages over 48 percent are indicative of fully supported aquatic life communities.
3. Periphyton density on substrate: The concentration of attached algae (measured by chlorophyll a) over a unit surface area. The referenced suggested range of acceptable conditions lies below a value of 150 milligrams per square meter.
4. Sestonic chlorophyll: The concentration of planktonic algae floating in the water column of the stream. Literature references found that total chlorophyll values over 25 or 30 micrograms per liter and sestonic chlorophyll levels over 8 – 15 µg/L are problematic. A value of 5 µg/L is targeted.

The numeric endpoints for these TMDLs indicating attainment of WQS on Sand Creek will be:

1. MBI values below 4.5
2. Percentage of individuals comprising the EPT families exceeds 50 percent
3. Periphyton chlorophyll concentrations below 150 mg/sq m.
4. Sestonic chlorophyll concentrations below 5 µg/L.

The endpoints have to initially be maintained over three consecutive years to constitute full support of the designated uses of Sand Creek. After standards are attained, simultaneous digression of these endpoints more than once every three years, on average, constitutes a resumption of impaired conditions.

In phase one, the first stage will be a reduction of the median total phosphorus concentration at SC535 to 0.348 mg/L, based on the average of the median values of sampling stations within the 27d Ecoregion. The phase one loading capacity for SC535 at the 50 percentile flow condition is 12.37 pounds per day of total phosphorus. If the first phase of reducing phosphorus levels on Sand Creek improves water quality but does not attain the biological indicators, a second phase of implementation will commence. Phase two's first stage will direct further reductions in wastewater phosphorus by Newton, while phase two's second stage would install treatment and practices on the tributaries to Sand Creek. The second stage will be targeted once the first stage is reached. The second stage will be a reduction of the total phosphorus median at SC535 to 0.154 mg/L, reaching a median equal to that of the best 25 percent of the stations within the 27d Ecoregion. The phase two LC for SC533 at 50 percentile flow condition is 5.47 lb/day total phosphorus.

All four biological measures are numeric endpoints for this TMDL document and will result in the attainment of WQS by eliminating any of the impacts to aquatic life, domestic water supply or recreation associated with excessive phosphorus and objectionable amounts of algae. Achievement of all four of the biological endpoints indicate loads of total phosphorus are within the LC of the stream, WQS are attained and are fully supportive of all the designated uses.

Designated Use(s), Applicable Water Quality Standard(s) and Numeric Target(s)

The submittal describes applicable water quality standards, including beneficial uses, applicable numeric and/or narrative criteria, and a numeric target. If the TMDL(s) is based on a target other than a numeric water quality criterion, then a numeric expression, site specific if possible, was developed from a narrative criterion and a description of the process used to derive the target is included in the submittal.

Designated Uses:

Sand Creek (4) - expected aquatic life support, primary contact recreation B, drinking water supply, food procurement, groundwater recharge, industrial, irrigation and livestock.

Beaver Creek (26) - expected aquatic life support; secondary contact recreation b, drinking water supply, food procurement, groundwater recharge, industrial, irrigation and livestock.

Mud Creek (16) - expected aquatic life support, secondary contact recreation b, food procurement and livestock.

Impaired uses: expected aquatic life, contact recreation and domestic water supply.

Water Quality Criteria:

Nutrients – Narratives: The introduction of plant nutrient into surface waters designated for domestic water supply use shall be controlled to prevent interference with the production of drinking water (K.A.R. 28-16-28e(c)(3)(D)).

The introduction of plant nutrients into streams, lakes or wetlands from artificial sources shall be controlled to prevent the accelerated succession or replacement of aquatic biota or the production of undesirable quantities or kinds of aquatic life (K.A.R. 28-16-28e(c)(2)(A)).

The introduction of plant nutrients into surface waters designated for primary or secondary contact recreational use shall be controlled to prevent the development of objectionable concentrations of algae or algal by-products or nuisance growths of submersed, floating or emergent aquatic vegetation (K.A.R. 28-26-28e(c)(7)(A)).

The phase one loading capacity for SC535 at the 50 percentile flow condition is 12.37 pounds per day of total phosphorus. The phase two LC at the same station and same flow condition is 5.47 lb/day. Allocations for all flow conditions assigned to the Sand Creek watershed are illustrated in Table 9 within the TMDL document.

Pollutant(s) of Concern

A statement that the relationship is either directly related to a numeric water quality standard, or established using surrogates and translations to a narrative WQS is included. An explanation and analytical basis for expressing the TMDL(s) through surrogate measures, or by translating a narrative water quality standard to a numeric target is provided (e.g., parameters such as percent fines and turbidity for sediment impairments, or chlorophyll-a and phosphorus loadings for excess algae). For each identified pollutant, the submittal describes analytical basis for conclusions, allocations and a margin of safety that do not exceed the loading capacity. If the submittal is a revised TMDL document, there are refined relationships linking the load to water quality standard attainment. If there is an increase in the TMDL(s), there is a refined relationship specified to validate that increase (either load allocation or wasteload allocation). This section will compare and validate the change in targeted load between the versions.

The state of Kansas does not have a numeric criteria for total phosphorus, but instead has narrative criteria for nutrients. A link has been established between the narrative criteria for nutrients and the numeric total phosphorus target. The EPA's current suggested benchmarks for stream total phosphorus in the South-Central Cultivated Great Plains Ecoregion is 0.067 milligrams per liter total phosphorus over the 10-state aggregate of Level III ecoregions. A similar total phosphorus benchmark for the Central Great Plains was 0.090 mg/L, spanning from Nebraska to Texas. The TMDL target is a direct reduction of the indicated pollutant of concern, total phosphorus. These TMDLs were established in phases and stages to assist in the progressive reduction of total phosphorus loadings and ambient concentrations with periodic assessment of the biological endpoints on the lower reaches of the stream.

Sand Creek resides largely within Ecoregion 27d, the Wellington-McPherson Lowland area. Low macroinvertebrate biotic index scores indicate high quality biological communities. Kansas protocol has been to delineate the boundaries between full and partial aquatic life support and between partial support and nonsupport for aquatic life as MBI scores of 4.5 and 5.4, respectively. Conditions of full support span phosphorus levels of 0.070 to 0.160 mg/L. Partial support is indicated on streams with phosphorus levels of 0.020 – 0.430 mg/L.

Four targets will be used to determine if the biological community of Sand Creek meet designated uses as stated in the narrative criteria for nutrients on aquatic life, recreation and water supply. All four targets are measures to determine if the biological community of Sand Creek reflects recovery and minimal disruption by the impacts described in the narrative criteria for nutrients on aquatic life, recreation and domestic water supply.

The numeric endpoints for these TMDLs indicating attainment of water quality standards on Sand Creek will be:

1. MBI values below 4.5,
2. Percentage of individuals comprising the Ephemeroptera, Plecoptera and Trichoptera families exceed 50 percent,
3. Periphyton chlorophyll concentrations below 150 milligrams per square meter and
4. Sestonic chlorophyll concentrations below 5 micrograms per liter.

The narrative criteria of the Kansas WQS are based on indications of the current conditions of the prevailing biological community. Excessive primary productivity of algae may be indicated by extreme swings in dissolved oxygen or pH as the chemical reactions of photosynthesis and respiration alter the ambient levels of oxygen or acid-base balance of a stream. Higher pH values tend to occur during higher photosynthesis periods.

If all four numeric endpoints for these TMDLs are met, attainment of Kansas WQS will be met by eliminating

impacts to aquatic life, domestic water supply or recreation associated with excessive total phosphorus and objectionable amounts of algae. All endpoints must be maintained over three consecutive years to be considered as fully supportive of designated uses.

Source Analysis

Important assumptions made in developing the TMDL document, such as assumed distribution of land use in the watershed, population characteristics, wildlife resources and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources, are described. Point, nonpoint and background sources of pollutants of concern are described, including magnitude and location of the sources. The submittal demonstrates all significant sources have been considered. If this is a revised TMDL document any new sources or removed sources will be specified and explained.

In the absence of a national pollutant discharge elimination system permit, the discharges associated with sources were applied to the load allocation, as opposed to the wasteload allocation for purposes of this TMDL document. The decision to allocate these sources to the LA does not reflect any determination by the EPA as to whether these discharges are, in fact, unpermitted point source discharges within this watershed. In addition, by establishing these TMDL(s) with some sources treated as LAs, the EPA is not determining that these discharges are exempt from NPDES permitting requirements. If sources of the allocated pollutant in this TMDL document are found to be, or become, NPDES-regulated discharges, their loads must be considered as part of the calculated sum of the WLAs in this TMDL document. Any WLA in addition to that allocated here is not available.

There are 13 permitted national pollutant discharge elimination system facilities upstream of SC535 in the Sand Creek watershed. There are six non-overflowing facilities that are prohibited from discharging. There are also three industrial facilities, two municipal facilities, a municipal separate storm sewer system permit and a pretreatment permit. The cities of Newton and Walton are the only two municipal wastewater treatment plants in the Sand Creek watershed that are permitted to discharge. Facility information is located in Table 7 within the TMDL document.

There are 16 certified or permitted concentrated animal feeding operations within the Sand Creek watershed, see Appendix A within the TMDL document. All of these livestock facilities have waste management systems designed to minimize runoff entering their operation and detain runoff emanating from their facilities. These facilities are designed to retain a 25-year, 24-hour rainfall/runoff event as well as an anticipated two weeks of normal wastewater from their operations. Typically, this rainfall event coincides with stream flow that occurs less than 1 - 5 percent of the time. It is unlikely total phosphorus loading would be attributable to properly operating permitted facilities, though extensive loading may occur if any of these facilities were in violation and discharged.

Though the total potential number of animals is approximately 7,505 head in the watershed, the actual number of animals at the feedlot operations is typically less than the allowable permitted number. There are 829 farms with 338,598 acres of farmland in Harvey County, and 974 farms with 599,022 acres of farmland in Marion County. There are 24,000 head of cattle in Harvey County and 59,000 head of cattle in Marion County.

Permitted CAFOs identified in this TMDL document are part of the assigned wasteload allocation. Animal feeding operations and unpermitted CAFOs are considered under the load allocation because there is currently not enough detailed information to know whether these facilities are required to obtain NPDES permits. This TMDL document does not reflect a determination by the EPA that such facility does not meet the definition of a CAFO nor that the facility does not need to obtain a permit. To the contrary, a CAFO that discharges or proposes to discharge has a duty to obtain a permit. If it is determined that any such operation is a CAFO that discharges, any future WLA assigned to the facility must not result in an exceedance of the sum of the WLAs in this TMDL document as approved.

Any CAFO that does not obtain an NPDES permit must operate as a no discharge facility. Any discharge from an unpermitted CAFO is a violation of Section 301. It is the EPA's position that all CAFOs should obtain an NPDES permit because it provides clarity of compliance requirements, authorization to discharge when the discharges are the result of large precipitation events such as in excess of 25-year and 24-hour frequency/duration or are from a man-made conveyance.

The Sand Creek watershed has 22,290 people. There are approximately 21,127 people residing within the watershed in the cities of Walton, North Newton and Newton. Households outside of the municipalities which operate wastewater treatment facilities are presumably using on-site septic systems. Based on the populations of Walton, North Newton and Newton relative to the watershed population, there are an estimated 1,163 people being served by on-site waste systems. The Spreadsheet Tool for Estimating Pollutant Load was used to identify

the number of septic systems in the 12 digit Hydrological Unit Code within the watershed. According to STEPL, there are approximately 305 septic systems, with an anticipated failure rate of 0.93 percent. Since 95 percent of the population within the watershed reside in the cities served by wastewater treatment facilities, failing on-site septic systems do not likely contribute to the total phosphorus impairment of the Sand Creek watershed.

Land use within the Sand Creek watershed is dominated by cropland at 63.5 percent. Grassland and developed areas comprise about 18.8 and 13.6 percent of the watershed, respectively. Forest, wetlands and open water comprise 2.8, 0.6 and 0.7 percent, respectively. About 98 percent of the Sand Creek watershed has a permeability value less than 1.71 inches per hour, which contributes to runoff during very low rainfall intensity events. As the watersheds' soil profiles become saturated, excess overland flow is produced. The majority of the nonpoint source nutrient runoff will be associated with cropland areas throughout the watershed that are in close proximity to the stream corridors. Runoff from the cropland and developed areas could contribute significant sources of total phosphorus loading.

Phosphorus is present over the landscape, in the soil profile and in terrestrial and aquatic biota. Wildlife can contribute phosphorus loadings, particularly if they congregate to a density that exceeds the assimilative capacity of the land or water.

All known sources of total phosphorus for the Sand Creek watershed have been listed and considered.

Allocation - Loading Capacity

The submittal identifies appropriate loading capacities, wasteload allocations for point sources and load allocations for nonpoint sources. If no point sources are present, the WLA is stated as zero. If no nonpoint sources are present, the LA is stated as zero [40 CFR § 130.2(i)]. If this is a revised TMDL document the change in loading capacity will be documented in this section. All TMDLs must give a daily number. Establishing TMDL "daily" loads consistent with the U.S. Court of Appeals for the D.C. circuit decision in Friends of the Earth, Inc. v. EPA, et al., No. 05-5015, (April 25, 2006).

This TMDL will be established in phases and stages to progressively reduce phosphorus loadings and ambient concentrations with periodic assessment of the biological endpoints on the lower reaches of Sand Creek. The initial phase will entail reductions in phosphorus levels of the Newton wastewater that should translate to median concentrations approaching the median total phosphorus concentration for Ecoregion 27d. Total phosphorus load reductions will occur throughout the stream and be monitored at SC535. Riparian management in areas adjacent to cropland and livestock management in the vicinity of streams within the watershed should reduce nonpoint source loads under conditions of moderate flows as part of stage two. The phase one target is a median total phosphorus concentration of 0.348 milligrams per liter, periphyton less than 150 milligrams per meter squared and sestonic chlorophyll less than 5 micrograms per liter. Once the concentrations at SC535 approach the phase one target, an intensive assessment of macroinvertebrate diversity will be made to determine compliance with the narrative nutrient criteria.

If one or more of the biologic endpoints are not met at the end of phase one, phase two will commence. Additional reductions in loads and phosphorus concentrations will be accomplished through enhanced implementation of controls on point and nonpoint sources. The desired target levels are comparable to the median concentrations seen on the best streams in Ecoregion 27d. Newton wastewater will undergo enhanced nutrient removal and the management of riparian activities will be extended to urban storm water contributing areas and along tributaries adjacent to cropland throughout the watershed. A second intensive biological assessment will be made once median phosphorus levels approach the regional benchmark of 0.154 mg/L of total phosphorus.

The phase one loading capacity for SC535 at the 50 percentile flow condition is 12.37 pounds per day of total phosphorus. The phase two LC at the same station and same flow condition is 5.47 lb/day. Allocations for all flow conditions assigned to the Sand Creek watershed are illustrated in Table 9 within the TMDL document.

Wasteload Allocation Comment

The submittal lists individual wasteload allocations for each identified point source [40 CFR § 130.2(h)]. If a WLA is not assigned it must be shown that the discharge does not cause or contribute to a water quality standard excursion, the source is contained in a general permit addressed by the TMDL, or extenuating circumstances exist which prevent assignment of individual WLA. Any such exceptions must be explained to a satisfactory degree. If a WLA of zero is assigned to any facility it must be stated as such [40 CFR § 130.2(i)]. If this is a revised TMDL document, any differences between the original TMDL(s) WLA and the revised WLA will be documented in this section.

The TMDLs and allocations for all flow conditions assigned to the Sand Creek watershed are illustrated in Table 11 within the TMDL document. The total phosphorus wasteload allocation at the 50 percent flow condition for phase one and phase two is 12.37 pounds per day and 5.47 lb/day, respectively. The total phosphorus municipal separate storm sewer systems WLA at the 25 percent flow condition for phase one and phase two are 0.52 lb/day and 0.39 lb/day, respectively.

The total phosphorus WLA per facility is 37.6 lb/day for Newton's wastewater treatment facility and 0.63 lb/day for Walton.

Load Allocation Comment

All nonpoint source loads, natural background and potential for future growth are included. If no nonpoint sources are identified, the load allocation must be given as zero [40 CFR § 130.2(g)]. If this is a revised TMDL document, any differences between the original TMDL(s) LA and the revised LA will be documented in this section.

The TMDLs and allocations for all flow conditions assigned to the Sand Creek watershed are illustrated in Table 11 within the TMDL document. The total phosphorus load allocation at the 25 percent flow condition for phase 1 and phase 2 is 5.94 pounds per day and 4.51 lb/day, respectively. Nonpoint sources are zero during low flow conditions when Sand Creek's flow is composed strictly of Newton wastewater.

Margin of Safety

The submittal describes explicit and/or implicit margins of safety for each pollutant [40 CFR § 130.7(c)(1)]. If the MOS is implicit, the conservative assumptions in the analysis for the MOS are described. If the MOS is explicit, the loadings set aside for the MOS are identified and a rationale for selecting the value for the MOS is provided. If this is a revised TMDL document, any differences in the MOS will be documented in this section.

The margin of safety provides some hedge against the uncertainty in phosphorus loading into Sand Creek, predominantly from the point source dischargers in the watershed. This TMDL document uses an implicit MOS relying on conservative assumptions assuring that future wasteload allocations will not cause further excursions. Design flows are used for the two municipal wastewater discharge facilities to set WLA. Four biological endpoints are used to assess the narrative criteria and have to be maintained for three consecutive years before attainment of water quality standards can be claimed. There is often a synergistic effect of phosphorus and nitrogen on instream biological activity. Concurrent efforts by the city of Newton to reduce the nitrogen content of its wastewater should complement the effect of phosphorus load reduction in improving the biological condition of Sand Creek.

Seasonal Variation and Critical Conditions

The submittal describes the method for accounting for seasonal variation and critical conditions in the TMDL(s) [40 CFR § 130.7(c)(1)]. Critical conditions are factors such as flow or temperature which may lead to the excursion of the WQS. If this is a revised TMDL document, any differences in conditions will be documented in this section.

A three season approach was used: the spring season consisting of the months of April, May and June; the summer - fall season consisting of the months of July, August, September and October and the winter season that includes January, February, March, November and December. The highest average total phosphorus concentrations are observed during the low flow condition in the summer - fall season and the lowest average total phosphorus concentrations are observed during the high flow condition in the winter season. The higher total phosphorus concentrations during the low flow condition are indicative of wastewater loading, which in this case is a result of total phosphorus loading from the city of Newton's wastewater treatment plant.

These TMDLs also apply across all flow conditions including high flow events when increased nutrient loading is likely to occur.

Public Participation

The submittal describes required public notice and public comment opportunities, and explains how the public comments were considered in the final TMDL(s) [40 CFR § 130.7(c)(1)(ii)].

The Lower Arkansas River Basin Advisory Committee met to discuss the TMDLs in the basin on May 31, 2012, in Hutchinson, September 12, 2012, in Halstead and on April 3, 2013, in Hutchinson. An active Internet website was established at <http://www.kdheks.gov/tmdl/index.htm> to convey information to the public on the general establishment of TMDLs and specific TMDLs for the Lower Arkansas Basin. A Public Hearing on this TMDL document was held on September 4, 2013, in Newton to receive public comments. The city of Newton provided

comments on this TMDL document. The KDHE provided a written response to the comments on October 24, 2013.

Monitoring Plan for TMDL(s) Under a Phased Approach

The TMDL identifies a monitoring plan that describes the additional data to be collected to determine if the load reductions required by the TMDL lead to attainment of water quality standards, and a schedule for considering revisions to the TMDL(s) (where a phased approach is used) [40 CFR § 130.7]. If this is a revised TMDL document, monitoring to support the revision will be documented in this section. Although the EPA does not approve the monitoring plan submitted by the state, the EPA acknowledges the state's efforts. The EPA understands that the state may use the monitoring plan to gauge the effectiveness of the TMDLs and determine if future revisions are necessary or appropriate to meet applicable water quality standards.

Future stream sampling will occur bimonthly at rotational station SC535 every fourth year, with 2014 being the next scheduled sampling year. Monitoring of tributary levels of total phosphorus during runoff events will help direct abatement efforts toward major nonpoint sources. Monitoring of total phosphorus below the Newton outfall in Sand Creek will help assess improvements in the nutrient removal processes. Monitoring of total phosphorus should be a condition of the Newton municipal separate storm sewer system permit within the watershed.

In 2015, macroinvertebrate and periphyton sampling will occur at accessible locations on lower Sand Creek. The stream will be evaluated for possible delisting after phase one implementation in 2022. If the four biological endpoints are achieved during 2018 - 2021, the conditions described by the narrative nutrient criteria will be viewed as attained and Sand Creek will be moved to Category 2 on the Integrated Report for the 2022 Section 303 (d) listing cycle. If they are not, phase two of this TMDL document begins in 2022.

Under the current version of the continuing planning process, the next anticipated revision would come in 2013, which will emphasize implementation of watershed restoration and protection strategy activities. Incorporation of this TMDL document will be made into the WRAPS. Recommendations of this TMDL document will be considered in the Kansas Water Plan implementation decisions under the State Water Planning Process for fiscal years 2012 - 2021.

Decisions will be made through the Little Arkansas River WRAPS regarding the implementation approach and follow up of additional implementation in the watershed. Sand Creek will be evaluated for delisting under Section 303(d), based on the monitoring data during the period 2012 - 2021. The decision for delisting will come in the preparation of the 2022 Section 303(d) list. Should modifications be made to the applicable water quality criteria during the ten-year implementation period, consideration for delisting, desired endpoints of this TMDL document and implementation activities may be adjusted accordingly. Incorporation of this TMDL document will be made into the WRAPS. Recommendations of this TMDL document will be considered in the Kansas Water Plan implementation decisions under the State Water Planning Process for fiscal years 2012 - 2021.

Once the water quality standards are attained, the adjusted ambient phosphorus concentrations on Sand Creek will be the basis for establishing numeric phosphorus criteria through the triennial WQS process to protect the restored biological and chemical integrity of Sand Creek.

Reasonable Assurance

Reasonable assurance only applies when less stringent wasteload allocation are assigned based on the assumption that nonpoint source reductions in the load allocation will be met [40 CFR § 130.2(i)]. This section can also contain statements made by the state concerning the state's authority to control pollutant loads. States are not required under Section 303(d) of the Clean Water Act to develop TMDL implementation plans and the EPA does not approve or disapprove them. However, this TMDL document provides information regarding how point and nonpoint sources can or should be controlled to ensure implementation efforts achieve the loading reductions identified in this TMDL document. The EPA recognizes that technical guidance and support are critical to determining the feasibility of and achieving the goals outlined in this TMDL document. Therefore, the discussion of reduction efforts relating to point and nonpoint sources can be found in the implementation section of the TMDL document, and are briefly described below.

The states have the authority to issue and enforce state operating permits. Inclusion of effluent limits into a state operating permit and requiring that effluent and instream monitoring be reported to the state should provide reasonable assurance that instream water quality standards will be met. Section 301(b)(1)(C) requires that point source permits have effluent limits as stringent as necessary to meet WQS. However, for wasteload allocations to serve that purpose, they must themselves be stringent enough so that (in conjunction with the water body's other

loadings) they meet WQS. This generally occurs when the TMDL(s)' combined nonpoint source load allocations and point source WLAs do not exceed the WQS-based loading capacity and there is reasonable assurance that the TMDL(s)' allocations can be achieved. Discussion of reduction efforts relating to nonpoint sources can be found in the implementation section of the TMDL document.

The State Water Plan annually generates \$16 - 18 million and is the primary funding mechanism for implementing water quality protection and pollution reduction activities in the state through the Kansas Water Plan. The state water planning process coordinates and directs programs and funding toward watershed and water resources of the highest priority. The state allocates at least 50 percent of the fund to programs supporting water quality protection. This watershed and its TMDL document are located within a high priority watershed restoration and protection strategy area and should receive support for pollution abatement practices that lower the loading of sediment and nutrients. Due to the need to reduce the high nutrient loads in the Sand Creek watershed, which contribute to further impairments on the Little Arkansas River, these TMDLs will be a high priority for implementation.

The primary participants for implementation will be the city of Newton wastewater and storm water programs and agricultural and livestock producers operating immediately adjacent to the Sand Creek and tributaries within the priority subwatersheds above Newton. Watershed coordinators and technical staff of the WRAPS, along with Conservation District personnel and county extension agents should assess possible sources adjacent to Sand Creek, Mud Creek and Beaver Creek. Implementation activities to address nonpoint sources should focus on those areas with the greatest potential to impact nutrient concentrations adjacent to these streams.

The Little Arkansas WRAPS 9-Element plan will be reviewed every five years starting in 2016. The timeframe of this document for best management practice implementation of the sediment and phosphorus TMDLs is forty years. The WRAPS will examine BMP placement and implementation in 2016 and every subsequent five years through 2051. Subwatershed total reduction milestones for nutrient BMP implementation in the 9-element plan calls for 52,703 pounds of total phosphorus reductions through cropland BMPs and 38,199 lb of total phosphorus reductions through livestock BMPs, totaling 90,902 lb in phosphorus reduction in the Sand Creek watershed. The Little Arkansas WRAPS 9-element plan implementation schedule is based on a 40-year plan, however if practices are implemented as documented, it will only take 22 years to meet the endpoint.

Phase one priority is focused on wastewater treatment at Newton and riparian management along the lower reaches to effectively reduce the phosphorus loading to the stream. Phase two priorities will expand nonpoint source abatement along Sand Creek, Mud Creek and Beaver Creek.

Use of biological nutrient removal technology has been well established to reduce nutrient levels in wastewater, including phosphorus. Nutrient control has been proven effective through conservation tillage, contour farming and use of grass waterways and buffer strips. The proper implementation of comprehensive livestock waste management plans has proven effective at reducing nutrient runoff associated with livestock facilities.

Reduction strategies for Newton wastewater should be evaluated by mid-2013 with subsequent planning, design and construction of any necessary enhanced biological nutrient reduction completed within the next permit cycle after 2017. Urban storm water and rural runoff management should commence in 2013 in the city of Newton. Pollutant reduction practices should be installed within the priority subwatersheds before 2015, with follow-up implementation, including other subwatersheds from 2016 - 2020. If biological conditions warrant, phase two implementation will begin in 2022 and continue through 2032.

This watershed lies within the Little Arkansas Subbasin (hydrological unit code 8: 11030012), which is among the top sixteen HUC8s targeted for state action to reduce nutrients. The city of Newton lies within the HUC12, 110300120406. Since this TMDL document is initially driven by the implementation of point source treatment improvements, this is the top priority HUC12 within the watershed. The segment between Newton's outfall and Sedgwick is the highest priority. The initial priority for nonpoint source and the municipal separate storm sewer system is the segment above Newton City Park Lake on Sand Creek. Other nonpoint source priority areas can be further identified based on the cropland areas adjacent to the streams within the watershed. This priority HUC12 is additionally identified in the approved 9-element WRAPS plan within the Little Arkansas WRAPS critical targeted areas for nutrients.